U.S. Department of Commerce
Elliot L. Richardson,
Secretary

National Bureau of Standards
Ernest Ambler, Acting Director

National Bureau of Standards Certificate

Standard Reference Material 4261

K-X-Ray-Emission-Rate Standard
Cadmium-109

This Standard Reference Material consists of cadmium-109 deposited, as the chloride, on polyester tape approximately 0.006-cm thick and covered by another layer of the same tape. The source is approximately centrally located and about 3 mm in diameter. The tape is supported on a thin aluminum annulus 3.8-cm inside diameter and 5.4-cm outside diameter.

The number of silver K x rays emitted per second at 1200 EST, June 15, 1976, was

* ± 1.5%*.

The K-x-ray-emission rate was measured in the National Bureau of Standards low-geometry sodium-iodide x-ray-detector system, the overall efficiency of which was determined from measured geometrical and absorption factors. Confirmatory measurements of this calculated efficiency were performed using iron-55 sources, which had previously been calibrated for K-x-ray-emission rate by means of 4πx-high-pressure proportional counting.

The uncertainty in the certified K-x-ray-emission rate, 1.5 percent, is the linear sum of 0.3 percent, which is the limit of the random error of the sodium-iodide measurements at the 99-percent confidence level (4.604 S_m, where S_m is the standard error computed from 5 measurements), and 1.2 percent, which is the sum of the estimated upper limits of conceivable systematic errors.

The gamma-ray emissions from this standard reference material were examined with a Ge(Li) detector in the energy region from 88 keV to 1900 keV and ^{65}Zn and ^{110m}Ag were identified as impurities. As of May 12, 1976 the activity ratios $^{65}Zn/^{109}Cd$ and $^{110m}Ag/^{109}Cd$ were both approximately 6×10^{-7}. No other impurities were found.

This Standard Reference Material was prepared and calibrated in the Center for Radiation Research, Radioactivity Section, W. B. Mann, Chief.

Washington, D.C. 20234 J. Paul Cali
June, 1976 Office of Standard Reference Materials

SRM 4261-